The Hunterian Oration
1879

G. M. HUMPHRY

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THE

HUNTERIAN ORATION,

FEBRUARY 14, 1879.

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THE

HUNTERIAN ORATION,

DELIVERED AT

The Royal College of Surgeons of England,

ON THE

14TH OF FEBRUARY, 1879,

BY

GEORGE MURRAY HUMPHRY, M.D. F.R.S.

HON. FELLOW OF DOWNING COLLEGE, CAMBRIDGE,
CORRESPONDING MEMBER OF THE IMPERIAL SOCIETY OF SURGEONS, PARIS,
PROFESSOR OF ANATOMY IN THE UNIVERSITY OF CAMBRIDGE,
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Cambridge and London:
MACMILLAN AND CO.
1879

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TO

JOHN SIMON, C.B., D.C.L. OXON., F.R.S.,

PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS
OF ENGLAND,

THIS ORATION

IS DEDICATED

IN SINCERE RESPECT

FOR HIS LEARNING, HIS TALENTS,

AND HIS CHARACTER.

CAMBRIDGE, *Feb.* 1879.

THE

HUNTERIAN ORATION.

Mr President, my Lords and Gentlemen,

The best memorials of the dead are undoubtedly those which do most good to the living; and the purpose of this oration, I conceive, is not simply to honour Hunter, but, still more, to inspire and rouse succeeding generations of surgeons by reminding them, from time to time, of the salient points of his character, and to endeavour so to fan the fire of his example that it may burn more and more steadily and brightly and may warm us and others to nobler and better work. What could Hunter have more desired than that his memory should be an abiding influence, inducing his followers to appreciate and utilize the stores which he has left? What more suitable supplement to them could be made than a provision for some, even the humblest, effort to awaken his spirit among the custodians of his treasure; and where can that spirit be

better invoked than in the resting place of the works among which it loved to dwell?

Few lives of those who have taken a prominent place in the world's history were so devoid of incident and so full of lesson, so wanting in romance and so abounding in fact; few in which that which may be called accident played so small a part, and in which the man's own character so largely determined the course and events; and, for this reason, few are so well suited for example and instruction as that of him in whose memory we are met to-day.

Sprung from those northern tenants of our island who are inferior to no branch of the human stock in calm firm thinking capacity, and corresponding steadiness of purpose and strength of body; a member of a family which gave evidence of being no mean example of its race—John Hunter spent his earlier years in a manner calculated to promote manual dexterity and bodily strength rather than mental culture; and not till the age of twenty did he apply himself to the calling of his life. By many this would be thought late, too late; but I am disposed to believe that it is about the very best age for entering upon a professional career—a career, that is, which demands the full exercise of the mental faculties. It is the time of life when the mind, though retaining suppleness and impressibility, has acquired sufficient firmness to resist falsities and sufficient strength and independence to guide itself aright, and when it is likely to enter upon a new work with rational confidence and determination, not as a plaything to be toyed with, but as a

business to be seriously set about and perseveringly followed. It is no small advantage that the calling of life should be, from the first, regarded in this light and commenced in this manner, an advantage which more than compensates for the supposed, and possibly real, benefits of an earlier initiation. There can be no doubt that the Medical profession has suffered in quality and status, as well as in practical outcome, from being commenced, in many instances, by lads who had not only an insufficient mental training, but who had not the solidity of character and the tone of thought which should be present in those whose business it is to seek amid the chambers of death for the means of fortifying and prolonging life.

Once definitely devoted to his work, Hunter stuck to it with unrelaxing tenacity for five and forty years; and, when the silver cord was suddenly loosed, he was cut off, as a mind still vigorous and a body in most respects also vigorous should be, in the thick of work, full of plans for the future which involved yet more labour, the hardest of all, the labour of gathering up the threads of the past, and weaving them into a consistent texture. How many have thus passed away full of intentions for summing up life's efforts and of arranging in one comprehensive whole the fragments of their work! To how many in the evening of an industrious day has the aspiration to accomplish this task given an interest and occupation, and has, so, worthily and happily, filled that interlude between life's activity and death's advent which is apt to be spent in restless search after rest, and in fruitless efforts to

satisfy the long nurtured expectations of the time when the hotter periods of life's fretful fever should be over, and the anticipated real enjoyment, which is thought to be associated with cessation from activity, might begin!

That the neglect of early education, a main element in which is subordination to the will of others with associated mental and moral discipline, threw some shadow over Hunter's life there can be no doubt; but this loss may have had its, more or less, compensating gain in giving freedom to that ardent spirit of enquiry, that independence of observation and that originality of thought which formed such important features of his character, features the checking of which is a too frequent penalty of drill and systematic education.

Rarely, at any rate, can so good an account be given of five and forty years of a human life, of so much work done, of so much thought gone through, of so much result attained. The students of his museum and his works, and we all are such, are sufficiently impressed with this, and there is no need for me to dilate upon it. I would rather try to take some hints from the character and method of him who thus well employed his time, some hints for our guidance at this important period of medical education and advancing science.

A meditation upon the life and work and writings of Hunter always leaves the mind imbued with a sense of two salient, all-pervading features, which may be expressed by the words 'work' and 'thought,' or "observation" and "reflection."

These two factors, it need scarcely be said, lie at the root of all success in science. It is not, however, the amount, enormous as it is, so much as the well-adjusted balance of these two in Hunter that impresses us and by which we feel that his great results were achieved. He was not a genius in that which is the ordinary, if not the proper, acceptation of the term—in the sense, that is, which implies an unusual aptitude or faculty for certain things, and which is commonly associated with a proportionate inaptitude for some others; but he possessed in a marked degree that combination of sterling qualities which give sureness and success to effort. The vast collection in the adjoining rooms is an evidence of his working power and his indefatigable industry, and it shows that he was unrivalled in the τέχνη, the skill, required for the work; and the remnant of the no less vast pile of manuscripts which accompanied it, shows, as indeed do the specimens themselves, the σοφία, the strength of thought that was associated with and directed the work. To have made such a museum is one of the greatest of human achievements; to have thought carefully and well upon every specimen in it is far more, it is one of the greatest of human glories. We prize that museum, not merely as a mine of wealth in facts, but even more as an example and a lesson of thought upon facts and of the relation which one should have to the other.

Of the kind of genius to which has been attributed the privilege of instinctively distinguishing truth from error, or which we may rather say has been masked by that attribute, for it is simply the genius of

painstaking—"the transcendent capacity for taking trouble"—with its attendant soundness of judgment, the combination of greatness in detail with greatness in summation, Hunter was an eminent example. It was not in his nature to throw out bold suggestions and sparkling ideas which glitter from afar, and attract the eye and stimulate the aspirations, and carry men away, and which may either prove *ignes fatui* or may be beacons along the high road of truth, and which may, accordingly, lure us much astray or may startle us with the impulse of great discovery. He was rather a steady laborious pioneer, who so well laid the paths over a large amount of district, that others could safely follow and could learn from his method how to make further sure advance. He did not so much shape the polished corners of the temple of science as lay those solid stones which are of such manner as not to be thrown down, and upon which the edifice may be securely built; and he gathered the materials as well as placed them together. He does not captivate by his enthusiasm or charm by his eloquence. He makes no hyperbolic statements, and indulges in no fervid imagination. He was influenced by no *odium theologium* or *anti-theologium*, was actuated by no ambition, by no love of lucre or thirst for applause, but simply, quietly, observingly and thoughtfully, plodded along the road of search for truth.

It needs very little acquaintance with Hunter's works to recognise the two features to which I have alluded, for they are manifested by them all; and we soon perceive that the well-balanced proportion of pure

work and strong thought which he everywhere displays was the basis of his success and of the influence which he has exerted. He rarely makes an observation which does not lead to a reflection, and rarely makes a reflection which is not founded upon an observation or which does not lead to one. His investigations evince a large amount of the *methodus*, the *ordo et processus* of Bacon and a minimum of the *vaga experientia se tantum sequens*, which, as that philosopher forcibly expresses it, *mera palpatio est, et homines potius stupefacit quam informat.* He was essentially given to matter of fact, and was no less essentially a lover of theory; and his facts and his theories were in due relation to one another. Few men have worked more and made more experiments; few have thought more; and in fewer still has the balance between so large an amount of work and so large an amount of thought been, through life, so well maintained. In few has reflection been so greatly the incentive to observation, and has observation furnished the stimulus to, and the material for, reflection. This importunate double, or rather reciprocating, necessity to feed his thought with facts, and to enliven and anneal his facts with thought, shows itself in his letters —his letters to Jenner are full of it—in his lectures, in his essays and in his museum; and this it was that kept alight that lamp of zeal and industry which never ceased to burn steadily before the altar of science. His thoughts were not directed much to the work and observations of others, but were chiefly centred on his own; and his observations were not stimulated by the

suggestions of others, but were almost exclusively the result of the promptings of his own reflections. Indeed his own work and his own thought found ample material for each other. Hence his writings remain, to the present day, a repertory of fact and thought, the greatest and most valuable that surgery has ever had.

True, the railway rate of progress in other things has not been without its counterpart in Surgery, which has been almost revolutionised, and vastly improved, by subcutaneous sections, by excisions, by better treatment of wounds, antiseptically and otherwise, by the introduction of anæsthetics and gentler methods suited to a more sensitive age, by auscultation and other means of acquiring more accurate data, as well as by views respecting embolism, vascular inhibition and stimulation, cell formation and emigration, and the many results obtained from microscopical, chemical, and physiological investigation, and, above all, by more conservative treatment and greater attention to sanitary precautions. And here I cannot forbear to mention that crowning triumph of surgery with which the names of Spencer Wells and Keith will ever be honourably associated, and which far exceeds all its predecessors. The record recently given of forty-four unselected cases, in succession, some apparently desperate, in which the operation of ovariotomy was successfully performed, is, without question, the grandest in the history of surgery. Many of us have lived through the period in which this operation has made its way, in spite of the denunciations of the highest authorities, and has attained to such results

as to make us thankful to have reached the time in which woman is thus relieved from one of her gravest maladies. It makes us more than ever proud of our calling, and illimitably hopeful of the future powers of surgery to bring relief to the sufferings of mankind.

Still, the pride of modern research and boasted intelligence is humbled by a short conference with Hunter's writings, where the observed facts are so many and often yet so new, where the reasonings are so fresh and so sound, and, above all, where the philosophic blending of fact and thought is so striking, so masterly, and so all-pervading, that as mines of material as well as models of thinking, as examples how to dig and how to use the treasure, in short, as media of real instruction, they are still paramount. I never turn to his *Principles of Surgery* without a renewal of the feeling that it is the most comprehensive, the most philosophic, and the best exposition of the subject ever yet written, the work which it is the most profitable to read, the one which, more than any other, carries us, above craft and technical details, into the region of principles and general laws. Would that it was more studied by ourselves and more commended to those whom we teach and examine.

Hunter's mind, it is true, was not cast in the same mould as those of Socrates and Plato, of Bacon and Locke; he was not given to a philosophy developed in dialectic word-play, to the theories of schoolmen, or to the exercises of abstract reasoning. Hence it has been felt by some that the reasoning faculty in him was not equal to that of observing. To admit this to some

extent is, I suppose, only to admit that he was moulded according to the proper, at any rate for scientific purposes the most practically potential, human type; for, in man, the observing must, or should, always precede and furnish the data for, and so be the basis of, even if it does not exceed, the thinking. Thinking is kept in legitimate bounds only by the often repeated checks of observing; and its frequent resort and ready submission to such checks is an evidence of that control wherein the correctness and strength of thought chiefly consists. Herein, in the well maintained and mutually controlling relation between thought and observation, was the secret of Hunter's power. It was the hair-lock upon which his Samson's strength depended. It was not by observation and experiment, great as was the range and excellence of these, so much as by the manner in which he used them to regulate his reason, that he laid the foundations of modern surgery and gave us cause to honour him this day and to strive to follow him; to follow, that is, his method, for follow him we cannot. He did what no one since his time could venture to attempt, what indeed his own researches, by widening the range of the sciences over which he travelled, have forbid others to aspire to. He took the whole subject of Life within his grasp, and strove to investigate and illustrate, if not to understand, it by phenomena observed and reflected upon, in the vegetable and animal world, past and present, in health and disease, in variety and reparation.

It was the centre about which his thoughts revolved; and it forms the leading idea in all his works,

in his *Principles of Surgery*, no less than in his treatises on the blood and other physiological subjects. It is made the connecting link which binds anatomy, physiology, pathology, and surgery inseparably together. No man has taken so large a view of it, and treated it on so grand a scale, and laboured at it in so vast a field. The manner in which it is handled in his writings forms the best illustration of his method; and we may well pause for a moment to consider what were the views upon this greatly contested subject of one who brought so large an amount of observation and experiment, and, not only so much strength, but so much purity of thought to bear upon it, who could contemplate the great problems of matter, force, and life, in the cool altitude of his own quiet sphere of observation and reflection, far above the heated and perturbing arena of controversy, and who could recognise that no evil to man's moral and better nature ever has accrued, or ever can, from the free exercise of the high prerogative of thought, provided it is used in the simple sincere aspiration for truth.

In no parts of his writings are his penetration, his breadth of conception, and his caution, more strongly manifested than in those which relate to this tempting and difficult subject. He gives no precise definition of Life, for he says "of all things on the face of the earth definitions are the most cursed." With true philosophic spirit he ascends to it, step by step, from a consideration of the simple properties of matter, being conscious that, from them, all our impressions and all our ideas are derived, and perceiving that the

knowledge of them must be our guide to the apprehension of it. With regard to them the old notions of spirit influence, rudely shaken by the father of medicine, were not likely to be revived by one who could write that "as the causes and effects of matter seem to be entirely connected with matter itself, and to be a property in and inseparable from it, and as these are becoming better known the 'presiding spirits' are every day vanishing and their authority becoming less[1]". In these few clear words Hunter showed that he had penetrated the mists which hang around the fundamental questions of natural science as much as men have done since his time, that he saw into them about as far as human eye has ever seen, and that he had attained to that which, after a century of further and often angry disputation, we are compelled to regard as being probably the *ne plus ultra* of human knowledge. He recognised the potentiality of matter, and, with that economy of thought, and that caution which characterize his efforts and were among the causes of their large results, he forbore to press the enquiry further into those speculations as to ultimates, those questions as to the origin of matter, and the nature of its properties, respecting which men may dogmatize and quarrel, and hopelessly dogmatize and quarrel on, because they are upon the confines of, if not within the circle of, the unknowable. Into such dark regions, where observation gives no sufficient footing for thought, Hunter did not venture; and so he avoided the pitfalls into which some more reckless adventurers

[1] *Essays and Observations*, by Owen, p. 8.

have slipped, and the dreary wastes into which others have wandered.

Whatever, in their essence, these properties, or principles, of matter might be, he considered Life to be one of them or akin to them; and his reasoning about it is highly interesting. He speaks of it, in one place, as "the principle of self-preservation; preventing matter from falling into dissolution," in another, as "an agency leading to new modifications of matter, and procuring those chemical and other combinations which are concerned in the formation and growth of animal and vegetable bodies. These are products which no chemistry will make. Fermentation will resolve them, but will not produce them." He, at one time, speaks of life as producing, at another, as proceeding from, these modifications; but whether he regarded the circle of life as consisting in the producing and the proceeding from, whether he considered that as the *omne vivum* proceeds *ab ovo*, so the *omne ovum* is produced *a vivo*, does not appear. He was perplexed between the views which divide the physiologists of to-day, and which are tersely expressed by him as follows: "Life, then, appears to be something superadded to this peculiar modification of matter; or this modification is so arranged that the principle of life arises out of the arrangement." The principle, he says, can with difficulty be conceived; but he shows that matter may take on new properties without being altered in itself, as to the species of matter, by the illustration of a bar of iron which appears the same whether endued with the properties of magnetism or not, which magnetism does not

seem to depend on the formation of any of its parts. "A bar of iron without magnetism may be considered animal matter without life. Set it upright, it acquires a new property, the property of attraction and repulsion, at its different ends. Now, is this any substance added, or is it a certain change which takes place in the arrangement of the particles of iron giving it this property?"

Thus Hunter pondered. He evidently felt that the observed facts were insufficient to enable him to form a right conclusion respecting the nature of life and the relation of the living principle to the ordinary properties of matter; and he was under no temptation to strain his views beyond the horizon which bounded them for the sensation of gratifying some persons and startling and alarming others. Had he lived now, and thought and written with the knowledge that has cumulated since his time, his difficulties would not have been much lessened; and we may hope that his moderation and impartiality would have been what they were. His cool judgment, we may trust, would have told him that science never has afforded, and possibly never will afford, any sure basis from which to carry on either the attack or the defence of religion, and that, while it is the province of the man of science to press enquiry on into the causes of natural phenomena, and to seek the explanation of what passes around us and in us, and to refer these, more and more, to what are called laws, there is yet an ever-receding cause of those laws, and that hence there still are many things which are not, and possibly never will be, in

our philosophy. He might have perceived, and perhaps none the less clearly for that increased range of knowledge which would have given him wider view, that it is open to each investigator to feel that there are thoughts very deep, far deeper than our thoughts; and though, to use the expressive words of a living writer[1]:

> "Science, whose soul is explanation, halts
> With hostile front at mystery."

yet her most ardent devotee may freely admit that

> "God moves in a mysterious way,
> His wonders to perform."

Hunter might, with the same breath, have consoled the veriest materialist and the most anxious theologian, and have told both that the field of nature is common ground in which they may dig, and dig fearlessly together, and that it will yield according to the seed with which it is sown.

From the manner in which he speaks of the properties of matter, of the formation of the world, of the production and distinction of vegetables and animals, which he regards as only a new modification, or species, of matter, of the immutability of an absolute existence, &c., it requires no great stretch of imagination to think that his mind was feeling its way towards those doctrines of evolution, correlation of force, and indestructibility of matter and force, which have occupied so large a share of scientific attention in recent times, and which seem to forbid, even in idea, the separation of matter from force or spirit, the finite from the infinite, the changing or temporal

[1] George Eliot, *Macmillan's Magazine*, July 1878, p. 166.

from the unchanging or eternal, the created from the creating. Not that I would in the least disparage those who, since his time, have done such good work in this field, or would be ranged among the *laudatores temporis acti*, who find nothing new under the sun, who, gloating in their knowledge of the past, love to contrast the present unfavourably with it, and who, in the generalizations and speculative philosophies of former times, see foreshadowed the discoveries of our own. We, like our predecessors, dream of things that may be, and perhaps will be; and if all the dreams of the present were recorded, such multitudinous combinations of thoughts would surely be found to anticipate some of the views and discoveries of posterity. But such dreams, though they are based upon real thoughts and real knowledge, and are the produce of mental play upon them, are too vapourish and unsubstantial to fix themselves even upon ourselves, or to give a real impetus to any thing. No one will class Hunter among the dreamers — he was far from that; but he thought much, and apparently was in the habit of writing down his thoughts as they occurred. Some of these thoughts seem to point in directions which he probably did not contemplate. And as the students of Turner's pictures may discover many things which that great artist never intended to pourtray, so the reader of Hunter may fancy that he sees many things which that great thinker never imagined, or never imagined with the definiteness which would constitute a real idea.

But, it may be said, What good have Physiology

and reflections upon such abstruse subjects as the phenomena, nature and causes of life, done to Surgery? In what way, if at all, are the improvements which have taken place in the knowledge and treatment of disease attributable to the connection between Physiology and Surgery, which Hunter established? The direct dependence of the one upon the other may not, it is true, be always easy to show, for those agencies which have the greatest potency are not unfrequently the least apparent. There can, however, be little doubt in any thoughtful mind, that the influence of physiological views, with their associated mental culture, on the progress of Surgery during the last century, has been incalculably great, and has done more than anything, not only to pave the way for, but to engender, truer conceptions of disease, and better modes of treatment, and has, so, contributed vastly to elevate the tone and status of the profession, and to promote the welfare of mankind. Though we may not be able to trace the several improvements directly to the suggestions of Physiology, we may be certain that many of them would not have taken place without it. Even in the case of anæsthetics, which apparently owed their employment exclusively to experimental evidence, we may fairly doubt whether they would not have been anathematised, as tending to curtail the penances which man had deserved, if their introduction had not been supported and justified by those better views of man's nature which are associated with a sounder knowledge of his physiology. It is all very well to talk of the practical character of

Surgery; but those who are best acquainted with its past history, and present position, will be most ready to acknowledge that there is no department of human work which has been so dominated by theory, as it ever has been, and still is, and that the most barbarous and baneful practices of by-gone times have been justified by, if they did not originate in, the most absurd, yet tightly clung to, views respecting morbid humours, cleansing processes, &c. How terrible were the inflictions which those theories wrought in the treatment of wounds; and what a satire was it upon the supposed practical and observant qualities of the surgeons of those days, that these monstrous theories and their disastrous results could be uprooted only by the substitution of the still more absurd, but less pernicious, theory of the 'sympathetic cure,' which transferred to the sinning weapon the noxious drugs which had previously been destined to torment the wound; and, in these last times, the acceptance of an antiseptic treatment is due, in no small degree, to the belief in a septic theory. The so-called most practical men, those who especially pride themselves upon this quality, are not unfrequently the veriest dupes to theory. They are the worst observers because they are the most prejudiced, and they most doggedly resist any innovations of treatment which are repugnant to what they conceive to be right, and to the views they have held with a determination proportionate to their groundlessness. Indeed it would seem to be a feature of human nature that the more erroneous a view, and the less of reason it can claim, the more tenaciously

is it held. Certainly, that which has least of reason in it is most impregnable to the assaults of reason.

If, then, the practice of Surgery has such close relation to theory, and is so dependent upon it, how important is it that the theory should be based upon sound principles, and be cultivated by the ablest minds. This most practical of sciences is no exception to the law which rules all science, the law that thought is the polar-star of work, and that without its guidance and help no real progress will be made.

This Hunter saw, with this view he laboured, and we must continue in the same direction. He recognised that Pathology is the keystone of Surgery, resting upon a wide reaching study of Physiology, on the one side, and careful clinical observation on the other. To the physiological side of the arch his own attention was chiefly directed. At least it is to his labours in this field that his influence was mainly due. To the still germinating and fructifying produce of his perceptions of the relation between Pathology and Physiology we owe a clearer estimation of the important generalization, which must form the foundation of all rational treatment, that morbid processes, and morbid structutes, are only modifications of, and deviations from, the processes and structures of health: that, in his own words, they result from "perversion of the natural actions of the animal economy," and that to understand either thoroughly, we must study it in relation to the other, and watch closely the transition of one into the other. It is on the steady prosecution of research in this direction that our hopes

for further advance in the theory, with associated better and more scientific treatment, of disease must chiefly rest; and the feeling that a ravaging cancer is but the produce of some modification of natural and benign processes, gives a craving for a clearer apprehension of those processes, and of the essence and stages of this terrible, though it may be slight, modification of them, and throws a glimmer of hope over the prospect of dealing with this, at present, most hopeless and dire, and, I fear, growing, scourge of civilized humanity.

To those whose duty it is, and it is the most trying part of their duty, to witness the protracted sufferings and the mortality caused by this and other allied diseases, and who long for the time when science will bring some alleviation or remedy on its wings, it is no small discouragement to be met by an appeal to humanity against them in their pursuit of that method of experimental investigation, which was resorted to by Hunter and Harvey, and all, or nearly all, those to whom the world has been most indebted for accessions of knowledge in this direction, and which is the only method by means of which much further advance can be made. The old and unceasing battle between reason and feeling, is being, unfortunately, waged upon this ground. We may be sure that victory will ultimately be, as it has under similar circumstances, always been, that the warm impulses which easily run into prejudice, and which are, as usual, fanned by readily credited exaggeration and misrepresentation, will ere long wane before the

steady pressure of greater enlightenment and cool reflection.

We watch the phases of public sentiment on this question with no small anxiety, knowing full well that, while advancing civilization brings, with one hand, through the massing of people together, and the various modifications of their habits, a growing wave of disease, she offers, with the other hand, through increasing knowledge and improving methods of investigation, a no less sure means of staying and backening that wave. I say of backening the wave, because experience shows that the remedy, well used, may be more potent than the evil, and may produce an actual improvement in sanitary conditions, and a proportionate prolongation of life. But we feel that, unless we are free to use the remedy which civilization offers, we must suffer the evil she inflicts, the evil of physical, and, as the necessary associate with it, the evil of moral and social degradation. The question becomes more urgent as the more rapid strides of civilization enjoin us to avail ourselves of every aid which she affords. That experimentation on the lower animals, thoughtfully designed and carefully conducted, is one of the most important of these, is really essential to any thorough investigation of healthy and morbid processes, and to the greater assurance of the scientific basis of Medicine and Surgery, no one who is cognisant of these subjects can doubt; and we may trust that the rolling wheel of time will ere long give to the sympathies of those who now oppose it a higher and a better turn.

While thus dilating on the importance of Physiology, and the thoughts associated with it, to the practical work of Surgery, I must not omit to observe that the converse is no less true. The lessons which may be derived from the observation and treatment of disease are of the highest value, as Hunter found, to Physiology. The sciences are mutually illustrative and corrective; and it is sincerely to be hoped that the light which they are capable of throwing upon one another will not be lessened by the tendency to separation of Physiology from Anatomy and Surgery which the growth, especially of the first, seems to necessitate, but which we cannot but watch with some jealousy and apprehension.

It is, then, by the good adjustment and reciprocating influences of the practical and scientific, or of work and thought, that Surgery is to be advanced. This combination, and this alone, gives knowledge. I have already said that the enjoyment of the knowledge resulting from this combination, and of the mental efforts associated with it, must have been the stimulus to the persevering efforts of Hunter, and, so, the cause of the results which he obtained. We are all made of the same metal, though, in us, it may be less good and have a less clear ring than it had in him. The love of knowledge is deeply embedded in, and is a strong motive power with, us all. However richly our garden may be planted with other trees, the fruit of the tree of knowledge has the greatest attraction for us. Call it curiosity, or what you will, this love of knowledge is an inherent and active principle

at all ages and in all races. It is the very corner-stone of the temple of science. One of the great efforts of education should be to strengthen, to utilize, and to build upon it; and the pressing question respecting education, at the present time, is whether it does so. If it does not, if the love of knowledge is choked rather than nurtured, if the student ceases to take pleasure in mental effort, and has less and less desire for information, as time goes on, then has education failed in one of its chief purposes. The student may be brought to the fountain, he may be made to drink; but if the draught have lost its sparkle and refreshing quality he will start back from it as soon as he can.

Is there not reason to think that this is too much the case at the present time, not only in medical, but in general teaching? Does not the student, as a rule, fly from, rather than cling to, his work? Is not this a somewhat marked feature in our own country? If it is so, what is the cause and where is the fault? They are not in the nature of the pupil, for that, as I have just said, has an affinity, a desire, for knowledge; and they cannot be in the subject taught, for no subject is devoid of pleasure-giving quality. Must we not, then, look to the method of teaching? Wherein, in the main, do we most perceive the difference between the good teacher and the bad? Is it not that the pupils of the one are inclined to, and take interest in, and are happy in, their work, and therefore make progress in it, whereas those of the other do not? Both teachers may fail to recognise the cause of this

difference in their pupils. But the pupils have no difficulty in tracing it to the teachers. They find that the one imparts brightness and warmth, that the other brings dullness and coldness. From the one they obtain knowledge and derive stimulus to the pleasure of mental effort; from the other they fail to acquire these. The one, Hunter-like, associates facts with thoughts, connects the body with the spirit, and so makes it animate and buoyant; the other gives facts without thoughts, presents the body without the spirit, lifeless, heavy, depressing, an *indigesta moles*. The one brings the facts into relation with each other and binds them together by laws and principles, and so fastens them in the memory; the other leaves them isolated, scattered, evanescent. The one makes his pupils reasoning agents and gives them a taste of the pride and pleasure of being such; the other leaves them mere machines without fire and without impetus.

What were the views of Hunter upon this matter? He states in his *Principles of Surgery* that his object was to "fit his pupils to act as occasion may require from comparing and reasoning on known principles." "Too much attention," he goes on to say, "cannot be paid to facts; yet too many facts crowd the mind without advantage any further than they lead to establish principles." These words give the very marrow of sound teaching, and should be graven wide and deep in the walls of every school and in the heart of every teacher. They show that this master of observing and thinking was no less a master of the scarcely inferior province, the province of teaching.

They have, alas, been too little heeded. They were caught up, it is true, by one who used the strong mental power, with which nature had endowed him, to propel his class along the lines of observation and reflection which Hunter laid down, who strove to connect facts with principles, and to fit his pupils to act as occasion might require, and who was, in my humble opinion, for this reason chiefly, the greatest teacher of Surgery which this metropolis or Europe has produced since the days of Hunter. His example has been followed by some of his successors, but scarcely with the like power and persistence, or the like conviction of its value. Why should there have been a decadence in this respect? Why should not the philosophic character of teaching which Hunter inaugurated, and which Lawrence continued, and which, as we have seen, would produce the best practical results, have been more anxiously and systematically continued?

Apart from the unusual capacity of these two men for the work, there can be no doubt that the difficulty of carrying out a rational and really beneficial system of education, as opposed to what may be called cram, is greater than it was; and this increasing difficulty is, in the main, attributable to two factors, both of which are unavoidable, and which it is, therefore, our business to grapple with and seek to turn to good account.

The first is the mass of facts which accumulates with increasing rapidity in every branch of science, rendering the study of each more laborious, so dissociating it from others and reducing the range which

any individual can possibly grasp, and the breadth of view which he can command. Knowledge grows, but man stands still. That is to say, the intellectual powers of man are no greater now than they were in any of the known past ages—in the days, for instance, of Homer or of Plato, of Confucius, of Buddha, or of Moses, no more powerful to mould the material at hand; whereas the material has vastly increased. If the discrepancy between the Βίος βραχύς and the τέχνη μακρή was striking and oppressive to the mind of Hippocrates, what must it be now, seeing that the intervening period has gone on adding to the one without prolonging the other? Each of the many hills upon which the science of medicine is based, has been heightening, widening, separating from the others and growing into a mountain. It is impossible for any one to climb them all. Some must be abandoned. The alternative is short cuts, forced marches, superficial, and therefore evanescent, impressions, weariness of the mind and dislike of the pursuit. The level of qualification to practice has to be reached in some way or other, and quickly; therefore, the difficulties of the way must be smoothed, or skimmed over, instead of being carefully explored and mastered. There is danger of too much teaching and too little education, of too much pushing and dragging, alias coaching, and too little self help, of too much of being got up the paths of knowledge and too little of getting up. Those ready primers, but intellectual dampers and mental stuffing machines—the "vade mecums" and "handbooks,"—are brought into eager

requisition. The time of pupilage is converted into a period of struggle and cram and painful visions of insatiable examiners, instead of being a period of quiet study and of enjoyable, and proportionately profitable, preparation for the practice of the profession.

For, the Examinations constitute the second difficulty that I have referred to. They are annually growing in extent, in importance, and in influence. Indeed, they are becoming, or have become, the directors and regulators, the despots, of education. Teachers and students are compelled to conform to their behests. The Lecturer is bound by the examination cycle and the examination method; and the publisher finds the readiest sale for the books which quickest prepare for the examination standard. And, so to order Examinations that the maximum of good and the minimum of evil may result from them is the great educational problem of our time. They are necessary as tests of knowledge and, therefore, cannot be dispensed with. They furnish a stimulus to work which is obviously needed in many, if not in most, instances; and they have the great merit of compelling the student to clear his ship for action, to make his knowledge clear, defined, precise and producible; and they induce him to cultivate the very important faculty of concentrating his mental batteries, and bringing them to bear quickly and effectively upon the required point.

The great evil of Examinations, and the more strenuously to be contended with, because it is almost inevitable, is their tendency to make facts preponderate greatly over thought, and so to add to the accumu-

lating weight of that heap which oppresses the student and smothers his aspirations and interest in his work. It is a tendency which all who are experienced in Examinations and their influence cannot fail to have recognised and to regret; and they must feel the difficulty of avoiding it, especially in those Examinations which, from the numbers they affect, have the greatest influence, viz., the Examinations for a pass. It is a far easier and quicker process to test the student's knowledge of a fact than his capacity and habit of thinking upon and turning the fact to account. Yet, it need not be said, the latter is of infinitely greater importance. Indeed a fact is of little value, and little likely to be retained by the brain, unless it is graven in, and rendered capable of utilization, by thought.

Anatomy furnishes a good illustration of the manner in which the present system works. It is pursued with increasing attention and exactness of detail. The knowledge of the facts of Anatomy, we all admit, are essential to the practice of Surgery, and to an appreciation of Physiology; and the correct learning of them promotes the habit of attention, and of accuracy which is the associate of attention. Still it may be questioned whether, from an educational, or even from a practical, point of view, the result is proportionate to the time and labour expended in the way in which it is done. Certainly, there is no other subject which men exhibit so much proneness to forget, none which the over-distended memory so quickly disgorges as soon as the examination ordeal is over, and, too frequently, before that ordeal begins; and in the summary process the

useful is indiscriminately rejected with the superfluous. The knowledge, painfully acquired, is strainingly held and cheerfully let go. Hence the facts of Anatomy, being measured by an examination standard and acquired for an examination purpose, are repulsive to most students, are made a drudgery instead of being a pleasure, and become a means of deterring men from scientific pursuit instead of alluring them to it.

It will not, I am sure, for a moment, be thought that one who has devoted so large a part of life to the study and teaching of Anatomy, and who holds a responsible University position in relation to it, would speak disparagingly of it. On the contrary I have a thorough estimation of the educational, as well as of the practical, value which attaches to it, owing to the opportunities which it affords of associating reflection with observation; and, on this ground, I have ever maintained that it certainly ought to be developed in connection with our University system, and have laboured, and, I am glad to say, not unsuccessfully, for its admission among the subjects for the Honour Examination in the Natural Sciences at Cambridge, believing that its capabilities as an educational agent, if inferior to those of Physics, are equal to those of any of the other Natural Sciences subjects. But, in thus speaking of Anatomy, I do not mean an Anatomy which taxes memory without stimulating thought, which consists in a collection of naked facts without an appropriate clothing of the varied interest which properly attaches to them and which renders them attractive and seals them on the memory. I mean an Anatomy, not limited to the

technical details of the structure of the body, but a science implying an intelligent acquaintance with this the highest and most exquisite of existing forms. The dry bones, as Hunter would have taught them, and as Bell, to some extent, did teach them, not with purposeless and pedantic minuteness of detail, but as parts of a noble animal mechanism and full of meaning, would become instinct with life and would enlist the interest and stimulate the energies of the most unwilling student; and the facts thus learned would be far better retained; for the mind, like the itching palm, holds tightly that which it loved to seize. Haplessly, under present circumstances, teacher and student are deterred from these more pleasant and fertile fields by the fear that the produce will fail to bring the requisite marketable examination return. They feel that the facts alone are wanted; and the facts alone must be supplied, and culled, in all their coldness and massive repulsiveness. The pattern must be that of Hunter's Chinese philosopher, "whose knowledge consisted only in facts," and partakes little of the similitude of his European "who reasons from principles and thus accounts for facts."

I quite admit that these remarks apply, not to Anatomy alone, but, in greater or less degree, to the other branches of medical science and to examinations generally, and that the influence operates banefully upon the whole educational system of the country, with the result that thinking is not cultivated in due proportion to learning, and that mental stores are heaped with too little regard for the strengthening of the faculty to

use them. But in Medicine and Surgery, and in Anatomy above all, more particularly since Physiology has been, to a great extent, divorced from it, is the danger especially great; for the required facts are so many, and the time allotted to study and examination is so short. The evil, too, unfortunately, is not limited to the student period. It ranges into the subsequent stages of life, infecting the future guides and teachers and examiners, as well as the practitioners, and so propagates itself irresistibly. How rarely do men continue the study of their profession for any length of time out of pure love of it; and how refreshing, like mother earth touching, is it to come into contact with those who do so. Had Hunter been trained upon the present system, had he been weighed down by tightly compressed facts when a student, and, subsequently, by out-patient seeing, on the one hand, and pupil cramming, on the other, it is scarcely to be supposed that even his mind could have burst the iron fetters and could have regained its elasticity and love of work, or that even he could have found time for those reflections which gave such impulse to the science and practice of Surgery.

What can be done to effect an improvement, to counteract the mind-enslaving influence of accumulating facts and greater stringency of Examinations, and to bring about that larger association of thought with work, in our educational system, which would approach nearer to the Hunterian ideal, which would attach greater interest and pleasure to study, and would render our students more thinking agents, more able to

analyse and deal with the difficulties they encounter and, therefore, better fitted to take their rank as members of a learned and liberal profession?

The Examinations, as I have said, are, and must be, the despots of education. They have probably, for the present at any rate, been made sufficiently severe. What is required is a gradual alteration in their quality. They might well afford to be less exacting in the amount and variety of detail and circumstance, and to throw somewhat more weight into the scale of intelligent appreciation of the knowledge possessed, so that, by their requirements, they may develope a better adjustment of the balance of work and thought. They should not be considered merely as tests of fitness for certain positions and rewards, but, even more, as educational agents, as the guides of teaching and of study. Every question put must be regarded as a drop in the educational current of the future; and Examiners must recognise that they are not simply judges of the students who come before them, but that they are, in no less degree, directors of, and, so, responsible for, the teaching of those who will follow.

I see the objections that may be raised to this, and I have sufficient experience as an Examiner to know the difficulties of carrying it out; but objections and difficulties never fail to grow on the path to improvement. They sometimes seem to point the way and nerve us to overcome them; and they do so by telling that proportionately great efforts are necessary and must be made.

What is really wanted, and what teachers and examiners must combine to promote, is, to use the words of the 'laughing philosopher' Democritus, who was one of the greatest thinkers of antiquity, that "we should strive not after fulness of knowledge, but fulness of understanding," that is, that we should strive for good, clear, solid, intelligent, producible and available knowledge of the kind that will be useful in after life—not so much the refinements of Chemistry, Anatomy and Physiology, which, in their aggregate, are likely to perplex, encumber, stupefy, and then pass away like chaff before the wind, but the essential fundamental facts and principles welded together, and so woven into the student's mind that he can hold them firmly and wield them effectually, and that he is conscious of them, not as the goods of other men, or as dogmas which he has because they were imposed upon him, but as his own possessions, of which he appreciates the value because he knows how to use them. "The knowledge which a man can use is the only real knowledge, the only knowledge which has life and growth in it, and converts itself into practical power. The rest hangs like dust about the brain, or dries like rain-drops off the stones[1]."

It is a hopeful feature of our time that teaching is now occupying the serious attention of thoughtful minds, is beginning to be regarded as a science,—assuredly it is second to none in practical importance,—and that it is likely to receive that recognition at our Universities, as a subject of special study, which it

[1] Froude, *Short Studies on Great Subjects*, p. 267.

has ever deserved. A good influence thus engendered, and gradually telling upon the general education of the country, will do more than any other thing to promote the improvement of our profession, first, by the better preparation of those who enter it, and, secondly, by the improved methods of teaching in it which are sure to follow; and it will contribute as much as any thing to promote the future welfare of our country, and to give to our people that strength of mind and force of character which are more than ever necessary for the maintenance of our position among the nations of the earth. Whether it be in the workshop, on the exchange, in the sick-chamber, in the senate, or on the battle-field, the best educated, most thoughtful, most able persons, must take the lead. A home-striking confirmation of this is being now given in the lesson, which we ought never to have had occasion thus to learn, that English manufacture is being beaten out of the field, not in consequence of any accident or cause which we could not have foreseen, but, in great measure, because the English workmen are less intelligent, less thoughtful, less given to reading, less self-controlling, less provident, than those of some other competing countries. Must not, and ought not, success to be with the nation in which these qualities are most abounding? The question whether the prosperity and influence of Britain are to continue, whether our flag is to rule the waves of the future, and for a thousand years to brave the battle and the breeze, must depend upon the education of her people, and not upon the amount, but

upon the quality of that education, that is, upon the mental training which it gives, and the thought-producing power which it evolves. Teachers and Examiners are the masters of the world's position. Let them feel their power and combine to use it well.

In this far-reaching work our College has an important part to perform, and is answerable to the profession and the country for the manner in which it fulfils it. It has a great inheritance; and, what is far more to the purpose, it has a great influence, and proportionately great responsibility. The wand, more potent than that of the magician, the arch enemy and sure destroyer of all magic, the wand of observation and thought, handed on to us by Hunter, and, in turn, wielded by Abernethy and Cooper, by Travers and Green, by Brodie, Lawrence and others, is now in our hands, and with it, the future destiny of the Surgery of England—the rank which Surgery is to take as a science, the degree to which it is to be raised above the level of empiricism. There is no one, Mr President, I am sure, who more fully appreciates this than yourself, no one who, from the vantage ground of a well cultivated mind, watches more jealously the curricula of professional study, and is more anxious that they should represent a liberal system of education. This is one of the many grounds which gives us confidence and pleasure in seeing you in the honourable position which you occupy, and which makes this College gratefully accept, and place among the treasured mementoes of its heroes, that expressive cast of a thoughtful mind, which has been lately presented

by those who feel and admire your powers and the good work you have done.

The maintenance of the close connection and mutual interdependence of Anatomy, Physiology, Pathology and Surgery, is one of the great duties of this College, which will need increasing vigilance and be a source of greater difficulty every year. The enlarging scope of each of these subjects separates them from one another, and necessitates a division in their teaching, their study and their examination. Still the man who can best combine them and wield their united force will be best able to solve the problems of disease, and shape his course to successful treatment. By this rational method only can we gain a sure footing, and be able to withstand the shocks of bold assertions which are the essence and strength of quackery, and to resist those violent vibrations of the pendulum of opinion, or rather of feeling, which, within a few years, have carried us, from wholesale venæsection to timidity at the application of a leech, and have threatened to drag us from the indiscriminate administration of alcohol to the total repudiation of it. If the profession is thus liable to be beaten from pole to pole by the changing blasts of fancy and fashion, it is no wonder that the public are wavering in their confidence, and are capable of being attracted by the bold promises of empiricism under whatever form its head is raised. The difficulties of the science of Medicine must not be shirked by indifference, or eluded by dogma. They must be admitted, sought after, welcomed. Without them it would be no science at all. By their nature

and their greatness they rank it in the forefront of science. Advancing knowledge reveals them more clearly, and tells more forcibly the debt of gratitude we owe to those benefactors of mankind who have taught us how to recognise them, and how to overcome them, and whose examples are therefore the light along the path we ought to follow.

One familiar face, Mr President, which we have long been wont to welcome on these occasions, is looked for in vain to-day; a face the open, manly and cheerful features of which told, in most unmistakeable manner, the genuine sincerity and genial character of the man. In John Hilton this College has lost one of its ablest administrators and one of its most zealous servants, one who never failed from his post till his absence warned us that we should ere long be deprived of his assistance; for we knew that nothing but illness, and that of no light kind, could keep him away. His surgical acumen and good sense taught him, and made him teach others from this place, that a large share of the power for good in our hands is represented by the shield rather than by the sword, forasmuch as it consists in warding off the foes that minister to and encourage disease, and in giving that rest which may leave the processes of nutrition free to resume their natural course. He thus carried out the principles in which Hunter and, Hunter's great rival, Pott agreed, and through which they inaugurated a new and more benign era in practical surgery. Had he been

more liberal to himself of the rest which he so freely prescribed for others, we might still have had the advantage of his business habits and the enjoyment of his social qualities.

In another of our Fellows, George Firth, Norwich has been deprived of a worthy successor of those eminent surgeons—Gooch, Donne, Rigby, Martineau, Dalrymple, and Crosse—who form a line the equal to which no other provincial town, so far as I know, can boast; and he was no unworthy representative of the high literary character which the city of Sir Thomas Browne has long maintained. *Integer vitæ*, with thoughts above the sounds of applause and the impulses of ambition, he upheld the honour and dignity of the profession by the surest and steadiest of all means, the force of a high and consistent example.

And, Sir, in the seemingly brief interval which has elapsed since that memorable day when, with Prince and peers and statesmen, we listened to the flowing utterances of the great orator who last performed this duty which I have so feebly attempted, how many of our Fellows and Members have obeyed the roll-call which has summoned them from a life of usefulness and activity, a life chequered with deep anxieties and heavy responsibilities and grave disappointments, on the one hand, and with glowing hope and cheering success and warm returns of thankfulness, on the other. They have passed away; but they join the spirit of the day in beckoning us onward, and in warning us to seize the opportunities which life affords, for they are great and they are sudden.

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